1074123

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08

Ref:

MEMORANDUM

SUBJECT: Libby Golf Course Exposures

FROM: Paul R. Peronard
On Scene Coordinator

TO: Interested Parties

Below is a series of very preliminary cancer risk calculations for CVCC golf course workers. The calculations are based on some strawman scenarios, using different datasets and risk models to estimate exposure and risk. The first set of calculations is based on direct exposure data collected from CVCC golf course workers in the Spring of 2005. These were full period samples collected from workers over the course of one work day. Depending on the risk model used, risk calculations range from mid 10E-06 to low 10E-05, assuming no other exposures to Libby amphibole (LA). An advantage of using this dataset for risk estimations is that it represents a direct measurement of full period exposures during real time activities at the golf course. A significant disadvantage is limited representativeness with respect to seasonal variation (data were collected on a single day and exposure would occur over the course of the season), as well as the small number of samples in the set. Also, the data represent an average exposure and as such do not represent a Reasonable Maximum Exposure (RME) estimate. Use of another parameter (such as the 95% upper confidence limit) for the exposure point concentration estimate could increase the risk calculations by perhaps an order of magnitude or more.] – this applies to all of the datasets.

In comparison to the first set of calculations, the other two sets of calculations use 1) a different exposure point concentration estimate derived from the mowing data based on the most recent round of outdoor ABS, and 2) a shorter exposure time (hours/day) to account for the fact that a golf course worker would not be expected to spend the entire workday mowing. An advantage of using this dataset is improved temporal representativeness (data were collected over a three month period and will soon be updated with the Spring ABS work). A disadvantage is limited comparability between outdoor ABS conditions and CVCC conditions. Note that if all the outdoor ABS data are used (i.e., raking and digging as well as mowing) to estimate the exposure point concentration, then exposure estimates, as well as risk estimates, can increase by an a factor of 3 or more. Again, an RME type calculation would likely move the calculations up to a 10E-2.

None of these sets of calculations accounts for uncertainty in the risk models, nor considers non-cancer endpoints. It should be noted that a similar range of risk estimates can be derived for exposures associated with disturbance of outdoor soils at individual residential properties in Libby as well.

Table Nomenclature:

Bin A- Non-detect by PLM, no visible vermiculite

Bin A+ Non-detect by PLM, visible vermiculite present

Bin B1 LA detected but reported at <0.2%

Bin B2 LA reported 0.2% < [LA] < 1.0%

INPUTS

Parameter	Value
BR (m3/hr)	1.0000
ET (hrs/day)	8.0
EF (days/yr)	150
Age at start	20
Age at finish	50
Cair (Total LA)*	1.2E-03
PCM RBF	0.45
BC RBF	0.045
Cair (PCM f/cc)	0.0005
Cair (BC f/cc)	0.000053

SQAPP					
Parameter	OUTPUT				
	IRIS	IRIS'	BC	Site-Specific	Other
Excess Cancer Risk	5.4E-06	8.9E-06	1.3E-05	1.4E-05	2.8E-05
RBC (air) (total LA f/cc)	0.3769	0.3038	0.2134	0.1374	0.0688

* Note that the mean concentration is based on the personal air samples (N = 7) collected from golf course workers.

INPUTS (Mowing)

Parameter	Value
BR (m3/hr)	1.0000
ET (hrs/day)	2.0
EF (days/yr)	150
Age at start	20
Age at finish	50
Cair (Total LA)*	3.4E-01
PCM RBF	0.45
BC RBF	0.045
Cair (PCM f/cc)	0.1508
Cair (BC f/cc)	0.015080

ABS (B1/B2 Mowing Only)					
Parameter	OUTPUT				
	IRIS	IRIS'	BC	Site-Specific	Other
Excess Cancer Risk	3.9E-04	6.3E-04	9.5E-04	1.0E-03	2.0E-03
RBC (air) (total LA f/cc)	0.3769	0.3038	0.2134	0.1374	0.0688

* Note that the mean concentration is based samples for the mowing scenario (N = 19) from locations with soil PLM-VE results that were B1 or B2.

INPUTS (All)

Parameter	Value
BR (m3/hr)	1.0000
ET (hrs/day)	2.0
EF (days/yr)	150
Age at start	20
Age at finish	50
Cair (Total LA)*	1.1E+00
PCM RBF	0.45
BC RBF	0.045
Cair (PCM f/cc)	0.4912
Cair (BC f/cc)	0.049120

ABS (B1/B2 All Activities)					
Parameter	OUTPUT				
	IRIS	IRIS'	BC	Site-Specific	Other
Excess Cancer Risk	1.3E-03	2.1E-03	3.1E-03	3.3E-03	6.4E-03
RBC (air) (total LA f/cc)	0.3769	0.3038	0.2134	0.1374	0.0688

* Note that the mean concentration is based samples from all scenarios (N = 57) from locations with soil PLM-VE results that were B1 or B2.

INPUTS (Mowing)

Parameter	Value
BR (m3/hr)	1.0000
ET (hrs/day)	2.0
EF (days/yr)	150
Age at start	20
Age at finish	50
Cair (Total LA)*	5.4E-01
PCM RBF	0.45
BC RBF	0.045
Cair (PCM f/cc)	0.2447
Cair (BC f/cc)	0.024468

ABS (Bin A (Vis+) Mowing Only)					
Parameter	OUTPUT				
	IRIS	IRIS'	BC	Site-Specific	Other
Excess Cancer Risk	6.3E-04	1.0E-03	1.5E-03	1.6E-03	3.2E-03
RBC (air) (total LA f/cc)	0.3769	0.3038	0.2134	0.1374	0.0688

* Note that the mean concentration is based samples for the mowing scenario (N = 20) from locations with soil PLM-VE results that were Bin A (Vis+).

INPUTS (All)

Parameter	Value
BR (m3/hr)	1.0000
ET (hrs/day)	2.0
EF (days/yr)	150
Age at start	20
Age at finish	50
Cair (Total LA)*	1.3E+00
PCM RBF	0.45
BC RBF	0.045
Cair (PCM f/cc)	0.5838
Cair (BC f/cc)	0.058383

ABS (Bin A (Vis+) All Activities)					
Parameter	OUTPUT				
	IRIS	IRIS'	BC	Site-Specific	Other
Excess Cancer Risk	1.5E-03	2.4E-03	3.7E-03	3.9E-03	7.5E-03
RBC (air) (total LA f/cc)	0.3769	0.3038	0.2134	0.1374	0.0688

* Note that the mean concentration is based samples from all scenarios (N = 60) from locations with soil PLM-VE results that were Bin A (Vis+).

Printed on Recycled Paper